CLAIMS

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A system for analyzing compatibility of access terminals, said system comprising:

a compatibility coefficient calculator accepting first array response vector information associated with a first access terminal and second array response vector information associated with a second access terminal input and providing a first compatibility coefficient result as a function of an absolute value of a product of the first array response vector information and a conjugate of the second array response vector information.

2. The system of claim 1, further comprising:

a reference coefficient calculator accepting the first array response vector information input and providing a first reference coefficient result as a function of an absolute value of a product of the first array response vector information and a conjugate of the first array response vector information.

3. The system of claim 2, further comprising:

a comparitor accepting information with respect to said first compatibility coefficient result and information with respect to said first reference coefficient result input and comparing said information with respect to said first compatibility coefficient result and said information with respect to said first reference coefficient result to determine compatibility of said second access terminal to said first access terminal.

4. The system of claim 3, wherein comparison of said information with respect to said first compatibility coefficient result and information with respect to said first reference coefficient result to determine compatibility utilizes a predetermined threshold.

5. The system of claim 4, wherein said predetermined threshold is determined by a carrier to interference ratio which is acceptable according to system operating parameters.

6. The system of claim 5, wherein said predetermined threshold (thres) is approximated for simplified implementation of said system such that $thres \approx thres^{mBits} \cdot 2^{EXPthres}$, where $thres^{mBits}$ are preferably 1 to 3 bits.

7. The system of claim 4, wherein said predetermined threshold is selected specifically for reverse channel communication.

8. The system of claim 4, wherein said predetermined threshold is selected specifically for forward channel communication.

9. The system of claim 3, further comprising:

a compatibility coefficient calculator accepting said first array response vector information and said second array response vector information input and providing a second compatibility coefficient result as a function of an absolute value of a product of the second array response vector information and a conjugate of the first array response vector information;

a reference coefficient calculator accepting the second array response vector information input and providing a second reference coefficient result as a function of an absolute

value of a product of the second array response vector information and a conjugate of the second array response vector information; and

a comparitor accepting information with respect to said second compatibility coefficient result and information with respect to said second reference coefficient result and comparing said information with respect to said second compatibility coefficient result and said information with respect to said second reference coefficient result to determine compatibility of said first access terminal to said second access terminal.

10. The system of claim 9, wherein if said comparison of said information with respect to said first compatibility coefficient result and said information with respect to said first reference coefficient result is determined to be within a predetermined threshold and said comparison of said information with respect to said second compatibility coefficient result and said information with respect to second reference coefficient result is determined to be within a predetermined threshold said first and second access terminals are identified as compatible.

11. The system of claim 9, further comprising:

a first normalizer normalizing said first compatibility coefficient result; and

a second normalizer normalizing said second compatibility result, wherein said first compatibility coefficient result and said second compatibility coefficient result are normalized prior to said comparison.

12. The system of claim 9, wherein said first array response vector information and said second array response vector information is normalized prior to calculation of said first compatibility coefficient result.

13. The system of claim 1, wherein said compatibility coefficient calculator comprises:

a complex multiplier accepting said first array response vector information and said second array response vector information and outputting a complex multiplication result thereof;

an accumulator accepting at least a portion of said complex multiplication result and accumulating said at least a portion of said complex multiplication result for elements of said first and second array response vector information;

an absolute value circuit accepting accumulated results of said accumulator and providing output as a function of an absolute value thereof; and

a complex summer accepting said absolute value function and providing summing with respect thereto.

14. The system of claim 1, further comprising:

an infinite impulse response filter accepting said first compatibility coefficient result and providing a filtered compatibility correlation result.

15. The system of claim 14, wherein said accepted first compatibility coefficient result and said filtered compatibility correlation result are for time n, and wherein said infinite impulse response filter further accepts a filtered compatibility correlation result for time $n-1$ for use in providing said filtered compatibility correlation result for time n.

16. The system of claim 15, wherein said infinite impulse response filter provides filtering of said accepted first compatibility coefficient result at time n (x[n]) as a function of said filtered compatibility correlation result for time $n-1$ (y[n-1]) as represented by

the equation $y[n] = y[n-1] + k \cdot (x[n] - y[n-1])$, where y[n] is the filtered result at time n, and k is the filter coefficient determining the bandwidth of the infinite impulse response filter.

17. The system of claim 7, wherein said filter coefficient k is selected for simplified implementation of said system such that $k = 2^{-kBits}$, where kBits is an integer determined by a desired infinite impulse response filter bandwidth.

18. The system of claim 1, wherein said first array response information comprises information with respect to a signal of said first access terminal as provided to an adaptive antenna array and said second array response information comprises information with respect to a signal of said second access terminal as provided to an adaptive antenna array.

19. The system of claim 1, wherein said first array response information comprises beam coefficients of an adaptive antenna array associated with a signal of said first access terminal normalized with respect to beam coefficients of said adaptive antenna array associated with a sector signal and said second array response information comprises beam coefficients of an adaptive antenna array associated with a signal of said second access terminal normalized with respect to beam coefficients of said adaptive antenna array associated with a sector signal.

20. The system of claim 1, further comprising:

a scheduler scheduling high data rate communications with respect said access terminals as a function of said first compatibility coefficient result.

21. The system of claim 20, wherein said access terminals measure data packets to be communicated to thereby identify relatively short data packets and relatively long data packets, wherein said scheduler provides for scheduling of said relatively short data packets at a low data rates and said relatively large data packets are communicated during said high data rate communications.

22. The system of claim 21, wherein said scheduler operates to provide a higher probability of scheduling high data rate communications for access terminals not communicating during a previously scheduled low data rate communication.

23. The system of claim 21, wherein said scheduler analyzes a number of past communications in determining if a particular access terminal should have said high data rate communications scheduled.

24. A method for analyzing compatibility of access terminals, said method comprising:

accepting first array response vector information associated with a first access terminal;

accepting second array response vector information associated with a second access terminal; and

calculating a first compatibility coefficient result as a function of a product of the first array response vector information and a conjugate of the second array response vector information.

25. The method of claim 24, wherein said calculating is further a function of an absolute value of said product of the first array response vector information and said conjugate of the second array response vector information.

26. The method of claim 24, further comprising:

calculating a first reference coefficient result as a function of a product of the first array response vector information and a conjugate of the first array response vector information.

27. The method of claim 26, wherein said calculating said first reference coefficient is further a function of an absolute value of said product of the first array response vector information and said conjugate of the first array response vector information.

28. The method of claim 28, further comprising:

comparing information with respect to said first compatibility coefficient result and information with respect to said first reference coefficient result to determine compatibility of said second access terminal to said first access terminal.

29. The method of claim 29, wherein said comparing comprises:

utilizing a predetermined threshold with respect to comparison of said information with respect to said first compatibility coefficient result and said information with respect to said first reference coefficient result.

30. The method of claim 29, wherein said predetermined threshold is determined by a carrier to interference ratio which is acceptable according to system operating parameters.

31. The method of claim 30, wherein said predetermined threshold (thres) is approximated for simplified implementation of said method such that $thres \approx thres^{mBits} \cdot 2^{EXPthres}$, where $thres^{mBits}$ are preferably 1 to 3 bits.

32. The method of claim 29, wherein said predetermined threshold is selected specifically for reverse channel communication.

33. The method of claim 29, wherein said predetermined threshold is selected specifically for forward channel communication.

34. The method of claim 28, further comprising:

calculating a second compatibility coefficient result as a function of a product of the second array response vector information and a conjugate of the first array response vector information;

calculating a second reference coefficient result as a function of a product of the second array response vector information and a conjugate of the second array response vector information; and

comparing information with respect to said second compatibility coefficient result and information with respect to said second reference coefficient result to determine compatibility of said first access terminal to said second access terminal.

35. The method of claim 34, further comprising:

identifying said first access terminal and said second access terminal with a same service group for simultaneous communication if said comparison of said information with respect to said first compatibility coefficient result and said information with respect to said first reference coefficient result is determined to be within a predetermined threshold and said comparison of said information with respect to said second compatibility coefficient result and said information with respect to second reference coefficient result is determined to be within a predetermined threshold said first and second access terminals are identified as compatible.

36. The method of claim 34, further comprising:

normalizing said first compatibility coefficient result; and

normalizing said second compatibility result, wherein said first compatibility coefficient result and said second compatibility coefficient result are normalized prior to said comparison.

37. The method of claim 34, further comprising:

normalizing said first array response vector information; and

normalizing said second array response vector information, wherein said normalization is prior to calculation of said first compatibility coefficient result.

38. The method of claim 24, wherein said calculating said compatibility coefficient comprises:

multiplying said first array response vector information and said second array response vector information to thereby provide a complex multiplication result thereof;

accumulating at least a portion of said complex multiplication result for elements of said first and second array response vector information to thereby provide an accumulated result thereof;

providing an absolute value as a function of said accumulated result to thereby provide an absolute value function thereof; and

summing said absolute value function.

39. The method of claim 24, further comprising:

filtering said first compatibility coefficient result using an infinite impulse response filter to thereby provide a filtered compatibility correlation result.

40. The method of claim 39, wherein said accepted first compatibility coefficient result and said filtered compatibility correlation result are for time n, and wherein said filtering utilizes a filtered compatibility correlation result for time n – 1 for in providing said filtered compatibility correlation result for time n.

41. The method of claim 40, wherein said infinite impulse response filter provides filtering of said accepted first compatibility coefficient result at time n (x[n]) as a function of said filtered compatibility correlation result for time n – 1 (y[n-1]) as represented by the equation $y[n] = y[n-1] + k \cdot (x[n] - y[n-1])$, where y[n] is the filtered result at time n, and k is the filter coefficient determining the bandwidth of the infinite impulse response filter.

42. The method of claim 41, further comprising:

selecting said filter coefficient k for simplified implementation of said method such that $k = 2^{-kBits}$, where kBits is an integer determined by a desired infinite impulse response filter bandwidth.

43. The method of claim 24, wherein said first array response information comprises information with respect to a signal of said first access terminal as provided to an adaptive antenna array and said second array response information comprises information with respect to a signal of said second access terminal as provided to an adaptive antenna array.

44. The method of claim 24, wherein said first array response information comprises beam coefficients of an adaptive antenna array associated with a signal of said first access terminal normalized with respect to beam coefficients of said adaptive antenna array associated with a sector signal and said second array response information comprises beam coefficients of an adaptive antenna array associated with a signal of said second access terminal normalized with respect to beam coefficients of said adaptive antenna array associated with a sector signal.

45. The method of claim 24, further comprising:

identifying said first access terminal and said second access terminal with a same service group for simultaneous communication as a function of information with respect to said first compatibility coefficient result and information with respect to said first reference coefficient result using a data rate scalar.

46. The method of claim 45, wherein said data rate scalar comprises a ratio with respect to an intended data rate and a minimum data rate.

47. The method of claim 24, further comprising:

scheduling high data rate communications with respect said access terminals as a function of said first compatibility coefficient result.

48. The method of claim 47, wherein said scheduling comprises:

measuring data packets to be communicated to thereby identify relatively short data packets and relatively long data packets;

scheduling said relatively short data packets at a low data rates; and

scheduling said relatively large data packets as said high data rate communications.

49. The method of claim 48, wherein said scheduling comprises:

providing a higher probability of scheduling high data rate communications for access terminals not communicating during a previously scheduled low data rate communication.

50. The method of claim 47, wherein said scheduling comprises:

analyzing a number of past communications in determining if a particular access terminal should have said high data rate communications scheduled.

51. A system for determining compatible access terminals for simultaneous communication at a high data rate, said system comprising:

a compatibility coefficient calculator accepting first array response vector information associated with a first access terminal and second array response vector information associated with a second access terminal input and providing a first compatibility coefficient result as a function of a product of the first array response vector information and a conjugate of the second array response vector information, said compatibility coefficient calculator further providing a second compatibility coefficient result as a function of a product of the second array response vector information and a conjugate of the first array response vector information;

a reference coefficient calculator accepting the first array response vector information input and providing a first reference coefficient result as a function of an absolute value of a product of the first array response vector information and a conjugate of the first array response vector information, said reference coefficient calculator further providing a second reference coefficient result as a function of a product of the second array response vector information and a conjugate of the second array response vector information; and

a comparitor accepting information with respect to said first compatibility coefficient result and information with respect to said first reference coefficient result input and comparing said information with respect to said first compatibility coefficient result and said information with respect to said first reference coefficient result to determine compatibility of said second access terminal to said first access terminal, said comparitor further accepting information with respect to said second compatibility coefficient result and information with respect to said second reference coefficient result and comparing said information with respect to said second compatibility coefficient result and said information with respect to said second reference coefficient result to determine compatibility of said first access terminal to said second access terminal.

52. The system of claim 51, wherein comparison of said information with respect to said first compatibility coefficient result and information with respect to said first reference coefficient result to determine compatibility utilizes a predetermined threshold, and

wherein comparison of said information with respect to said second compatibility coefficient result and information with respect to said second reference coefficient result to determine compatibility utilizes said predetermined threshold.

53. The system of claim 52, wherein said predetermined threshold is determined by a carrier to interference ratio which is acceptable according to system operating parameters.

54. The system of claim 53, wherein said predetermined threshold is selected specifically for reverse channel communication.

55. The system of claim 54, wherein said predetermined threshold is selected specifically for forward channel communication.

56. The system of claim 51, further comprising:

an infinite impulse response filter accepting said first compatibility coefficient result and providing a first filtered compatibility correlation result and accepting said second compatibility coefficient result and providing a second filtered compatibility correlation result, wherein said information with respect to said first reference coefficient result accepted by said comparitor comprises said first filtered compatibility correlation result and said information with respect to said second compatibility coefficient result accepted by said comparitor comprises said second filtered compatibility correlation result.

57. The system of claim 56, wherein said infinite impulse response filter provides filtering of an accepted compatibility coefficient result at time n (x[n]) as a function of a

filtered compatibility correlation result for time n – 1 (y[n-1]) as represented by the equation y[n] = y[n-1] + k · (x[n] – y[n-1]), where y[n] is the filtered result at time n, and k is the filter coefficient determining the bandwidth of the infinite impulse response filter.

58. The system of claim 51, wherein said first array response information comprises information with respect to a signal of said first access terminal as provided to an adaptive antenna array and said second array response information comprises information with respect to a signal of said second access terminal as provided to an adaptive antenna array.

59. The system of claim 51, wherein said first array response information comprises beam coefficients of an adaptive antenna array associated with a signal of said first access terminal normalized with respect to beam coefficients of said adaptive antenna array associated with a sector signal and said second array response information comprises beam coefficients of an adaptive antenna array associated with a signal of said second access terminal normalized with respect to beam coefficients of said adaptive antenna array associated with a sector signal.

60. The system of claim 51, further comprising:

a scheduler scheduling high data rate communications with respect said access terminals as a function of said first compatibility coefficient result.

61. The system of claim 60, wherein said access terminals measure data packets to be communicated to thereby identify relatively short data packets and relatively long data packets, wherein said scheduler provides for scheduling of said relatively short data packets at a low data rates and said relatively large data packets are communicated during said high data rate communications.

62. The system of claim 61, wherein said scheduler operates to provide a higher probability of scheduling high data rate communications for access terminals not communicating during a previously scheduled low data rate communication.

63. The system of claim 60, wherein said scheduler analyzes a number of past communications in determining if a particular access terminal should have said high data rate communications scheduled.

64. A method of scheduling access terminals for high data rate communication, said method comprising:

analyzing array response vector information of a plurality of access terminals to determine at least one service group of access terminals compatible for simultaneous communication;

scheduling high data rate communications with respect to access terminals of said at least one service group.

65. The method of claim 64, wherein said scheduling comprises:

measuring data packets to be communicated to thereby identify relatively short data packets and relatively long data packets;

scheduling said relatively short data packets at a low data rates; and

scheduling said relatively large data packets as said high data rate communications.

66. The method of claim 65, wherein said scheduling comprises:

providing a higher probability of scheduling high data rate communications for access terminals not communicating during a previously scheduled low data rate communication.

67. The method of claim 64, wherein said scheduling comprises:

analyzing a number of past communications in determining if a particular access terminal should have said high data rate communications scheduled.

68. The method of claim 61, wherein said analyzing array response vector information to determine at least one service group comprises:

using a data rate scalar for determining said at least one service group.

69. The method of claim 68, wherein said data rate scalar comprises a ratio with respect to an intended data rate and a minimum data rate.

70. The method of claim 61, wherein said analyzing array response vector information to determine at least one service group comprises:

using a predetermined threshold for determining said at least one service group.

71. The method of claim 70, wherein said predetermined threshold is determined by a carrier to interference ratio which is acceptable according to system operating parameters.

72. The method of claim 70, wherein said predetermined threshold is selected specifically for reverse channel communication.

73. The method of claim 70, wherein said predetermined threshold is selected specifically for forward channel communication.